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COMMENTS ON RAILROAD GRADE SEPARATION PRIORITY LIST FORMULA

The City of Los Angeles Department of Transportation (LADOT) received your notice for the Grade Separation Priority List Formula Workshop. The California Street & Highways (S&H) Code Section 2452 requires that the California Public Utilities Commission (CPUC) establish a priority list of projects most urgently in need of separation or alteration (emphasis added). The underlined phrase implies that the CPUC should determine the priority of projects based on safety criteria. With this concept, LADOT submits the following comments/suggestions to improve the priority list formula:

Formula For Existing Separations Nominated For Alteration or Reconstruction

$$P = \frac{V \times (T + 0.1\ LRT)\ (AH + BD)}{C \times F} + SCF$$

Current CPUC Formula

$$P = \frac{V \times (T + 0.1\ LRT)}{C \times F} + AH + BD + SCF + SofR$$

Mr. Barton's Recommendation

Vehicle, Train and LRT Volumes

The LADOT agrees with the multiplication of the vehicle, train and light rail transit (LRT) volumes as a primary basis for grade separation prioritizations. However, LADOT disagrees with the treatment of the LRT volumes. Since 1990, the transit agencies have grown and operate longer trains. The LRTs, like Metrolink and Amtrak provide transportation service to the public. The LRTs like Amtrak and Metrolink have similar safety concerns involving train vs vehicle crashes. Unlike the Amtrak and Metrolink or any other passenger train, the CPUC reduces the volumes of LRTs by a factor of 10 for prioritization purposes. This reduction is based on a comparison of freight trains with LRTs in D. 90-06-058. Since LRTs are longer and operate more frequently than 10 years ago, the CPUC, railroads and local agencies need to restudy this disparity between the LRTs, passenger trains and freight trains. Please include this item for discussion at the Workshop.

Project Costs and Inflation Factor

The average daily vehicle volume (V) multiplied by the average daily number of freight and passenger trains (T) and the average daily number LRTs represents the exposure for a crash between vehicles and trains/LRTs . The potential for accidents to occur (exposure) criteria should be the primary basis for project prioritization. The cost factor (C) and inflation factor (F) dramatically reduce the primary exposure, reducing the level of priority for projects, which is contrary to the determination of projects urgently in need of separation. The costs and inflation factors are used to determine allocation amounts for each project.

Streets & Highways Code Section 2454 provides allocations of 80% for grade separations, 50% for a proposed crossing separation, and 80% for alteration or reconstruction of existing separations based on available funds. The allocations are limited to $5 million per project or by the lesser of 1/3 of to total funds available or an amount based on the federal construction cost index increase since 1976 (an inflation factor). The project costs (C) and inflation factor (F) should be used to determine the project's allocation eligibility but not as "safety" criteria to determine the need of separation.

The cost and inflation factors were also used in the past, by the CPUC, for a cost benefit analysis. In the 1970's, the $15 million fund was able to support several projects at the 80% and 50% allocation levels. Today, with the average project cost estimate of $11-14 million (based on projects nominated in the last grade separation proceeding) and projects cost estimates ranged from $2 to 40 million dollars with a total of about $1 billion in projects. The $15 million state fund can not provide for the 80% and 50% allocations as intended in S&H Code 2454. Therefore, a cost benefit analysis based on total project costs in no longer valid. Instead the LADOT recommends that the denominator, of the vehicle and train volumes, be based on the allocation eligibility (AE) for each project. The AE factor would be based on the allocation amount for each project and replace the costs and inflation factor (CxF).

Any project that has a project cost estimate of $6.25 million or more ($5 million maximum allocation/0.8), and is eligible for an 80% allocation, should have an AE factor of 5000 ($5 million presented in $000 as used in the CPUC formula). If a project has a total cost estimate less than $6.25 million, and is also eligible for an 80% allocation, then the AE factor would be 80% of the total project cost estimate (presented in $000). For example, a project with a $4 million cost estimate would have a factor of 3200 ($4million x 0.8)/1000). For projects eligible for multiyear funding under S&H Code 2454(h), should have an AE factor equal to 80% of the total project costs presented in $000. The $5 million dollar maximum allocation is not applicable for multi-year funded projects. Using the AE factor will provide an allocation fund benefit rather than a project cost benefit analysis. The AE factor retains the urban vs rural comparison because the lower costing rural projects receive a lower AE factor.

Accident History

In the last proceeding, Mr. Bob Barton suggested that the vehicle, train and costs ratio not be multiplied by the accident history (AH) and blocking delay (BD) factors. Instead,

the AH and BD should be additive. LADOT agrees with Mr. Barton's suggestion. However, the City recommends that the method of calculation for each component be changed. The CPUC determines the AH based on the number of incidents, in a 10 year period, involving train vs vehicle and train vs pedestrian(s), at railroad crossings. The number of fatalities and injuries that resulted from each incident are also used to adjust the point allocations. Each incident is given a maximum of three points with calculations that add 2 points for each fatality, one point for each injury, and one point for each occurrence. The points assigned to each incident are then multiplied by a protection factor based on existing warning devices at the crossing.

The 10-year period for historical data needs to be discussed further at the workshop. It is not clear how the 10-year period was established. The points assigned to each accident are inappropriate. If a crossing has three accidents without any fatalities or injuries with a protection factor of 1.0, the CPUC assigns 3 points for AH. A similar crossing with one accident and a fatality, with the same protection factor, also receives 3 points. The first crossing should have a higher priority because of the higher number of train involved incidents. The LADOT recommends that AH points be based on the number of train/LRT involved incidents at the crossing regardless to the number of fatalities and injuries. Each incident/crash should receive the three points the CPUC assigns, and be multiplied by its corresponding protection factor. The AH, as the CPUC has done in the past, is the sum of the points of each incident.

Blocking Delay

The CPUC formula uses an average per train/LRT blocking delay. However, the vehicle, train and LRT volumes are based on average daily occurrences. The City suggests that the blocking delay also be based on an average total blocking delay per day, instead of an average delay per train. If a crossing has 10 freight trains with an 8 min blocking delay/train and 30 LRTs with a 0.5 min blocking delay/LRT, the BD, as exists with the CPUC formula, is 2.38 [(10 x 8 min + 30 x 0.5 min) / (10+30)]. A similar crossing with only the freight trains will have a BD of 8.0. A third crossing with only the 30 LRTs will have a BD of 0.5. However, the total blocking delay time per day for the first crossing is 95 minutes, 80 minutes for the second crossing and 15 minutes for the third crossing. The average total daily blocking delay better represents the crossings more urgently in need of separation. In the example given, the crossing with both freight trains and LRTs should have a higher BD.

The LADOT recommends that an average daily total blocking delay be used for the BD factor instead of an average daily blocking delay per train. The point allocation will also have to be revised for the different delay levels.

Special Conditions Factor

The Special Conditions Factor (SCF) represents the physical attributes that are unique to each crossing including traffic conditions. The SCF has six components, vehicular speed limit, railroad prevailing speed limit, crossing geometrics, alternate route availability, passenger trains and other factors. The vehicular speed limit and railroad prevailing speed limits are given points by the PUC based on speed ranges. The LADOT suggests that the speed limit points, for both vehicular and trains, be the speed

limit divided by a factor of 10. This method will provide a more accurate representation of the conditions that are at the crossing.

In the crossing geometrics, LADOT recommends the addition of an engineering judgment factor worth 3 points for unique geometry that may not be picked-up by the other components.

Include LRT volumes for the computation of the Passenger Train points. LRTs, like passenger trains, also transport people and have a similar safety concern as due Passenger Trains.

Of the Other Factors category, delete the hazardous materials trains & trucks category and replace with double-wheeled truck volumes regardless of the cargo. The double-wheeled truck volumes are easier to obtain.

State of Readiness

Mr. Barton's State of Readiness (SofR) factor is to recognize prior investments made by local agencies in engineering work and right of way acquisition and maintain continuity in the process. Provisions for the engineering, right-of way, preparation of environmental impact reports, utility relocation or any other pre-construction costs along with agreements, construction contracts, etc. are included in S&H Code Sections 2454, 2456 & 2457. If the project is eligible for an allocation the expenses associated with the pre-construction costs are refundable. In the case where the pre-construction costs are less than the local agency's contribution to the project, the costs may be excluded from the total project costs for prioritization analysis by the CPUC. This will help give the project a higher priority.

Caltrans funds projects based on the readiness of the project to proceed with construction as required by the provisions of Title 21, Subchapter 13, Section 1554. A project that is high on the priority list but is not ready to proceed will be skipped over by Caltrans and offer the funds to a project that is ready. For this reason, projects that are not on the top end of the priority list have been funded in past proceedings. To provide an additional benefit for readiness that does not contribute to the determination of urgent crossings in need of separation is inappropriate. The LADOT disagrees with Mr. Barton's readiness factor because the current funding process already incorporates the readiness of an agency to proceed with its project. The prioritization should be based on safety criteria and the funding allocation on readiness.

Formula for Alteration or Reconstruction of Existing Grade Separations

$$P = \frac{V \times (T + 0.1\,LRT)}{C \times F} + SF$$

Current CPUC Formula

$$P = \frac{V \times Const}{C \times F} + AH + BD + SCF + SofR$$

Mr. Barton's Recommendation

Mr. Barton suggests that the train volume be replaced with a constant for all existing separations. The reason is that the crossing is separated and does not have any vehicle vs train conflicts. The LADOT agrees that the vehicle and train conflicts are eliminated with the separation but the volumes of trains do have an effect in the safety evaluation of existing separations. There are two types of separations that the Commission evaluates in the prioritization, an underpass and overpass structure.

Train volumes do have an impact on underpass grade separations, where the train travels on the bridge over the roadway. The loading caused by the trains on the structures, especially older bridges, contributes to the deterioration of the bridge. Also, bridges that have cracks or loose concrete may become hazardous when a train rumbles the bridge loosening any concrete pieces that may fall on vehicles or pedestrians on the roadways. Bridges in similar conditions may exist throughout the state and if nominated for grade separation funds, should have the train volumes taken into consideration.

In the overhead structure, where vehicles travel over the tracks, the train volumes do not seem to have an effect on the overall safety of the structure. However, to keep the comparison with other projects, the train volumes should remain. This is similar to proposed new crossings that do not have any train or vehicle volumes and the estimated volumes used for these projects are based on adjacent crossings data.

The constant substitution for train volumes requires more discussion. Please add this item to the workshop agenda.

The SF in the CPUC Formula incorporates an accident factor similar to AH and therefore, the AH factor is not needed in Mr. Barton's revision. There is no blocking delay associated with existing grade separations. However, the CPUC formula does have a delay effects component in the evaluation. The SCF components for at grade crossings are not applicable to existing grade separations. The CPUC formula has incorporated conditions under the SF factor that better evaluate existing separations. LADOT's position on the State of Readiness factor is the same as the one taken for at-grade crossings. LADOT recommends keeping the CPUC's formula to evaluate existing grade crossings with the following recommendation: combine the accidents at or near structure (AS) criteria with the accident potential (AP) criteria into one category.

If you have any questions on the above comments, or would like to discuss this matter further, please contact Taimour Tanavoli at (213) 473-3970 or Jim Esparza at (213) 847 –1390.

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